K063866

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MAR 19 2007

BIOPLEX 2200 SYPHILIS IgG 510(k) SUMMARY

This summary of 510(k) safety and effectiveness information is being submitted in accordance with the requirements of SMDA 1990 and 21 CFR 807.92.

510(k) Number	510(k) Summary Report Date
K063866	March 8, 2007

MANUFACTURER INFORMATION

Manufacturer	
Manufacturer Address	Bio-Rad Laboratories, Inc. Clinical Systems Division 4000 Alfred Nobel Drive Hercules, CA 94547
Telephone	(510) 724-7000
Establishment Registration No.	2915274
Owner / Operator	Bio-Rad Laboratories, Inc. 4000 Alfred Nobel Drive Hercules, CA 94547
Owner / Operator No.	9929003
Official Correspondent for the BioPlex 2200 EBV IgG	
Official Correspondent Address	Bio-Rad Laboratories 6565 185th Ave NE Redmond, WA 98052
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Establishment Registration No.	3022521
Owner / Operator	Bio-Rad Laboratories 6565 185th Ave NE Redmond, WA 98052
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CLASSIFICATION INFORMATION

Classification Name	Treponema Pallidum Treponemal Test Reagents
Common Name:	Multi-Analyte Detection System Syphilis IgG
Product Trade Name	BioPlex 2200 Syphilis IgG on the BioPlex 2200 Multi-Analyte Detection System
Device Class	Class II
Classification Panel	Microbiology
Regulation Number	866.3830

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LEGALLY MARKETED EQUIVALENT (SE) DEVICES

Comparative FDA Cleared PREDICATE DEVICE	510(k) Number	Decision Date
Macro-Vue RPR Card (Becton Dickenson)	Pre-Amendment	N/A
Serodia TPPA (Fujirebio Inc.)	971502	11/13/1997
Trep-Chek Anti-Treponemal EIA (Phoenix Bio-Tech Corp.)	001552	10/19/2000

DEVICE DESCRIPTION

The Syphilis IgG kit uses multiplex flow immunoassay, a methodology that greatly resembles traditional EIA, but permits simultaneous detection and identification of many antibodies in a single tube.19 Three (3) different populations of dyed beads are coated with recombinant proteins associated with *T. pallidum* (15kD, 17kD and 47kD). The BioPlex 2200 System combines an aliquot of patient sample, sample diluent, and bead reagent into a reaction vessel. The mixture is incubated at 37°C. After a wash cycle, anti-human IgG antibody, conjugated to phycoerythrin (PE), is added to the dyed beads, and this mixture is incubated at 37°C. The excess conjugate is removed in another wash cycle, and the beads are re-suspended in wash buffer. The bead mixture then passes through the detector. The identity of the dyed beads is determined by the fluorescence of the dyes, and the amount of antibody captured by the antigen is determined by the fluorescence of the attached PE. Raw data is calculated in relative fluorescence intensity (RFI).

Three additional dyed beads, Internal Standard Bead (ISB), Serum Verification Bead (SVB) and a Reagent Blank Bead (RBB) are present in each reaction mixture to verify detector response, the addition of serum or plasma to the reaction vessel and the absence of significant non-specific binding in serum or plasma. Refer to the BioPlex 2200 System Operation Manual for more information.

The system is calibrated using a set of four (4) distinct calibrators vials, supplied separately by Bio-Rad Laboratories. Four (4) vials representing two (2) or three (3) different antibody concentrations are used for calibration. Results are calculated for each of the three (3) antibodies and are compared against their own respective cut-off and are expressed as an antibody index (AI). A single result is reported after completing a composite analysis of all the antibodies (the highest AI value is reported).

KIT COMPONENTS

Syphilis IgG (665-1450). The reagent pack contains supplies sufficient for 100 tests.

Vial	Description
Bead Set	One (1) 10 mL vial, containing dyed beads coated with affinity-purified *E. coli* derived recombinant proteins to *T. pallidum* (15kD, 17kD, and 47kD), an Internal Standard (ISB), a Serum Verification (SVB), and a Reagent Blank (RBB), with Glycerol and protein stabilizers (bovine) in a MOPS (3-[NMorpholino] propanesulfonic acid) buffer. ProClin®300 (0.3%) and sodium azide (<0.1%) as preservatives.
Conjugate	One (1) 5 mL vial, containing murine monoclonal anti-human IgG/phycoerythrin conjugate and anti-human FXIII/phycoerythrin conjugate, with protein stabilizers (bovine) in a phosphate buffer. ProClin®300 (0.3%) and sodium azide (<0.1%) as preservatives.
Sample Diluent	One (1) 10 mL vial, containing protein stabilizers (bovine and murine) in a triethanolamine buffer. ProClin®300 (0.3%) and sodium azide (<0.1%) as preservatives.

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ADDITIONAL REQUIRED ITEMS, AVAILABLE FROM BIO-RAD

Catalog #	Description
663-1400	BioPlex 2200 Syphilis IgG Calibrator Set: Four (4) 500 µL vials, containing *T. pallidum* (15kD, 17kD, and 47kD) antibodies in a human serum matrix made from defibrinated plasma. ProClin® 300 (0.3%) as a preservative for all calibrators.
663-1430	BioPlex 2200 Syphilis IgG Control Set: Two (2) 1.5 mL vials of Positive Control containing antibodies to *T. pallidum* 17kD and two (2) 1.5 mL vials of Positive Control containing antibodies to *T. pallidum* 15kD and 47kD in a human serum matrix made from defibrinated plasma, and two (2) 1.5 mL vials of Negative Control in a human serum matrix made from defibrinated plasma. ProClin® 300 (0.3%) as a preservative for all controls.
660-0817	BioPlex 2200 System Sheath Fluid: Two (2) 4 L bottles containing Phosphate Buffered Saline (PBS). ProClin® 300 (0.3%) and Sodium azide (0.1%) as preservatives.
660-0818	BioPlex 2200 System Wash Solution: One (1) 10 L bottle containing Phosphate Buffered Saline (PBS) and Tween 20. ProClin® 300 (0.3%) and Sodium azide (0.1%) as preservatives.
660-0000	BioPlex 2200 Instrument and Software.

INTENDED USE / INDICATIONS FOR USE

The Bio-Rad Syphilis IgG kit is a multiplex flow immunoassay intended for the qualitative detection of *Treponema pallidum* IgG antibodies in human serum. The test system, when used in conjunction with non-treponemal based assays, provides serological evidence of infection with *T. pallidum*. This test system is also indicated for use in confirming reactive test results from non-treponemal based screening assays.

The Syphilis IgG kit is intended for use with the Bio-Rad BioPlex 2200 System.

The BioPlex 2200 Syphilis IgG kit is not intended for use in screening blood or plasma donors.

Warning: A positive result is not useful for establishing a diagnosis of Syphilis. In most situations, such a result may reflect prior treated infection; a negative result can exclude a diagnosis of syphilis except for incubating or early primary disease.

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TECHNOLOGICAL CHARACTERISTICS

The following tables summarize similarities and differences between the BioPlex 2200 Syphilis IgG Kit and the predicate devices used in comparative studies with the BioPlex 2200 Syphilis IgG Kit.

A. BioPlex 2200 EBV IgG Assay vs. Predicate RPR Test

Table 1: Similarities between reagents and materials

Similarities between Components / Materials	**BioPlex 2200 Syphilis IgG Kit**	**Predicate RPR Test**
Reagents	The Bead Set reagent containing dyed antigen coated beads reacts with the patient sample.	The Antigen Suspension reagent reacts with the patient sample.

Table 2: Similarities between reagents with regard to function and use

Similarities between Function and Use	**BioPlex 2200 Syphilis IgG Kit**	**Predicate RPR Test**
Intended Use	Aid in the diagnosis of Syphilis	Aid in the diagnosis of Syphilis

Table 3: Differences between reagents and materials

Differences between Components / Materials	**BioPlex 2200 Syphilis IgG Kit**	**Predicate RPR Test**
Solid Phase	Bead Set reagent - dyed antigen coated beads.	None.
Reagents	Conjugate, Sample Diluent, Wash Buffer.	Antigen Suspension.
Sheath Fluid	Sheath Fluid is used to suspend the bead reagent and introduce it into the detector.	Not similar; not utilized in RPR tests.
Calibrators	Calibrators.	None.
Control	Negative Control and multi-analyte Positive Control.	User provided controls with established patterns of graded activity (optional Control Card Sets available).

Table 4: Differences between reagents with regard to function and use

Differences between Function and Use	**BioPlex 2200 Syphilis IgG Kit**	**Predicate RPR Test**
Analyte Detection	Multi-analyte qualitative detection of human IgG antibodies to *Treponema pallidum.*	Non-treponemal qualitative and quantitative detection of human reagin.
Matrices	Serum.	Serum and Plasma.

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B. BioPlex 2200 EBV IgG Assay vs. Predicate TPPA Test

Table 5: Similarities between reagents and materials

Similarities between Components / Materials	**BioPlex 2200 Syphilis IgG Kit**	**Predicate TPPA**
Reagents	Sample Diluent	Sample Diluent
Controls	Negative Control and multi-analyte Positive Control	Non-reactive Control Serum and Positive Control Serum (containing rabbit antibodies to *Treponema pallidum*)

Table 6: Similarities between reagents with regard to function and use

Similarities between Function and Use	**BioPlex 2200 Syphilis IgG Kit**	**Predicate TPPA**
Intended Use	Aid in the diagnosis of Syphilis	Aid in the diagnosis of Syphilis

Table 7: Differences between reagents and materials

Differences between Components / Materials	**BioPlex 2200 Syphilis IgG Kit**	**Predicate TPPA**
Solid Phase	Bead reagent - dyed antigen coated beads.	None.
Reagents	Conjugate, Wash Buffer.	Sensitized Particles, Unsensitized Particles.
Sheath Fluid	Sheath Fluid is used to suspend the bead reagent and introduce it into the detector.	Not similar; not utilized in TPPA tests.
Calibrators	Calibrators.	None.

Table 8: Differences between reagents with regard to function and use

Differences between Function and Use	**BioPlex 2200 Syphilis IgG Kit**	**Predicate TPPA**
Analyte Detection	Multi-analyte detection of human IgG antibodies to *Treponema pallidum.*	Detection of human antibodies to *Treponema pallidum.*
Matrices	Serum.	Serum and Plasma.

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C. BioPlex 2200 EBV IgG Assay vs. Predicate EIA Test

Table 9: Similarities between reagents and materials

Similarities between Components / Materials	**BioPlex 2200 Syphilis IgG Kit**	**Predicate EIA**
Reagents	Wash Buffer, Sample Diluent	Sample Diluent, Wash Buffer
Calibrator(s)	Calibrators	Calibrator
Controls	Negative Control and multi-analyte Positive Control	Negative Control and Positive Control

Table 10: Similarities between reagents with regard to function and use

Similarities between Function and Use	**BioPlex 2200 Syphilis IgG Kit**	**Predicate EIA**
Intended Use	Qualitative detection of IgG antibodies to *Treponema pallidum.*	Qualitative detection of IgG antibodies to *Treponema pallidum.*

Table 11: Differences between reagents and materials

Differences between Components / Materials	**BioPlex 2200 Syphilis IgG Kit**	**Predicate EIA**
Solid Phase	Bead reagent - dyed antigen coated beads.	96 well microplate – antigen coated microwells.
Reagents	Conjugate: Anti-human IgG / Phycoerythrin.	Conjugate: goat anti-human IgG / horseradish peroxidase, Substrate (TMB), Stop Solution.
Sheath Fluid	Sheath Fluid is used to suspend the bead reagent and introduce it into the detector.	Not similar; not utilized in EIA's.

Table 12: Differences between reagents with regard to function and use

Differences between Function and Use	**BioPlex 2200 Syphilis IgG Kit**	**Predicate EIA**
Analyte Detection	Multi-analyte detection of human IgG antibodies to *Treponema pallidum.*	Detection of human IgG antibodies to *Treponema pallidum.*
Matrices	Serum.	Serum and Plasma.

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PERFORMANCE SUMMARY

A. Expected Values

Prevalence
Expected values for the Syphilis IgG kit are presented by age and gender in the following tables for serum samples from unselected hospitalized patients (N=300), serum samples from patients who had a syphilis test ordered (N=500), and serum samples from unselected pregnant women (N=497). For all analytes, results of ≤0.8 AI are nonreactive, 0.9 and 1.0 AI are equivocal, and ≥1.1 AI are reported as reactive.

Table 13. Samples From Unselected Hospitalized Patients (N=300)

Age	Gender	BioPlex 2200 Syphilis IgG						Total
		Reactive		Equivocal		Nonreactive		
		N	%	N	%	N	%	N
0-9 years of age	F	0	0.0%	0	0.0%	0	0.0%	0
	M	0	0.0%	0	0.0%	1	100%	1
10-19 years of age	F	0	0.0%	0	0.0%	3	100%	3
	M	0	0.0%	0	0.0%	9	100%	9
20-29 years of age	F	1	5.3%	0	0.0%	18	94.7%	19
	M	0	0.0%	0	0.0%	16	100%	16
30-39 years of age	F	1	8.3%	0	0.0%	11	91.7%	12
	M	3	10.0%	0	0.0%	27	90.0%	30
40-49 years of age	F	3	10.7%	0	0.0%	25	89.3%	28
	M	4	9.3%	0	0.0%	39	90.7%	43
50-59 years of age	F	2	7.4%	0	0.0%	25	92.6%	27
	M	7	16.3%	0	0.0%	36	83.7%	43
60-69 years of age	F	1	8.3%	0	0.0%	11	91.7%	12
	M	4	19.0%	0	0.0%	17	81.0%	21
70-79 years of age	F	4	36.4%	0	0.0%	7	63.6%	11
	M	2	18.2%	0	0.0%	9	81.8%	11
80-89 years of age	F	0	0.0%	0	0.0%	6	100%	6
	M	0	0.0%	0	0.0%	3	100%	3
> 89 years of age	F	1	25.0%	0	0.0%	3	75.0%	4
	M	0	0.0%	0	0.0%	1	100%	1
Total		33	11.0%	0	0.0%	267	89.0%	300

Table 14. Serum Samples From Patients Who Had a Syphilis Test Ordered (N=500)

Age	Gender	BioPlex 2200 Syphilis IgG						Total
		Reactive		Equivocal		Nonreactive		
		N	%	N	%	N	%	N
< 10 years of age	F	0	0.0%	0	0.0%	0	0.0%	0
	M	0	0.0%	0	0.0%	1	100%	1
10-19 years of age	F	0	0.0%	0	0.0%	31	100%	31
	M	0	0.0%	0	0.0%	1	100%	1
20-29 years of age	F	3	4.0%	0	0.0%	72	96.0%	75
	M	4	14.8%	0	0.0%	23	85.2%	27
30-39 years of age	F	3	6.8%	0	0.0%	41	93.2%	44
	M	5	10.9%	2	4.3%	39	84.8%	46
40-49 years of age	F	3	10.3%	0	0.0%	26	89.7%	29
	M	23	21.5%	0	0.0%	84	78.5%	107
50-59 years of age	F	3	10.0%	0	0.0%	27	90.0%	30
	M	18	26.5%	1	1.5%	49	72.1%	68
60-69 years of age	F	2	14.3%	0	0.0%	12	85.7%	14
	M	3	18.8%	0	0.0%	13	81.3%	16
70-79 years of age	F	1	33.3%	0	0.0%	2	66.7%	3
	M	3	50.0%	0	0.0%	3	50.0%	6
80-89 years of age	F	0	0.0%	0	0.0%	1	100%	1
	M	0	0.0%	0	0.0%	1	100%	1
Total		71	14.2%	3	0.6%	426	85.2%	500

Table 15. Serum Samples From Unselected Pregnant Women (N=497)

Age	BioPlex 2200 Syphilis IgG						Total
	Reactive		Equivocal		Nonreactive		
	N	%	N	%	N	%	N
10-19 years of age	0	0.0%	0	0.0%	42	100%	42
20-29 years of age	3	1.4%	0	0.0%	208	98.6%	211
30-39 years of age	3	1.5%	0	0.0%	193	98.5%	196
40-49 years of age	0	0.0%	0	0.0%	47	100%	47
Unknown	0	0.0%	0	0.0%	1	100%	1
Total	6	1.2%	0	0.0%	491	98.8%	497

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B. Reproducibility Studies

A reproducibility panel, consisting of seven (7) panel members for each of the three (3) recombinant proteins associated with *T. pallidum* (15kD, 17kD and 47kD) was prepared by Bio-Rad Laboratories. Two (2) of the seven (7) members for each analyte had high positive levels of antibodies, and two (2) had positive antibody levels near the cutoff, additionally, there were two (2) high negative panel members and one (1) low negative panel member for each analyte. In addition, one positive control (antibody positive for 15kD and 47kD), one positive control antibody positive for 17kD) and a negative control (antibody negative for all analytes) were also tested. Reproducibility testing was performed at each of three (3) US testing facilities on a total of three (3) lots of the Syphilis IgG kit, three (3) lots of the Syphilis IgG Calibrator Set, and three (3) lots of the Syphilis IgG Control Set. Each testing facility evaluated reproducibility using one (1) kit lot of the Syphilis IgG kit with matched calibrators and controls. The panels were provided to each of the testing sites. Each of the seven (7) panel members and positive and negative controls was tested in duplicate (x2) on two (2) runs per day for three (3) days at each of three (3) US testing facilities using one (1) lot of BioPlex 2200 Syphilis IgG Reagent Pack and one (1) lot of Syphilis IgG Calibrator Set (2 times x 2 runs x 3 days x 3 sites = 36 replicates per panel member and controls). The data were analyzed for intra-assay and inter-assay reproducibility according to the principles described in the Clinical Laboratory Standards Institute guidance EP5-A2, revised November 2004 and ISO/TR 22971:2205. The standard deviation (SD) and percent coefficient of variation (%CV) were calculated. Positive results can be found in Table 16.

Table 16. Reproducibility; BioPlex 2200 Syphilis IgG

Syphilis IgG Panel Members		Sample N	Grand Mean AI	Within-Run		Between-Run		Between-Day		Between-Site*		Total	
				SD	%CV	SD	%CV	SD	%CV	SD	%CV	SD	%CV
T. pallidum recombinant 15kD	High Positive 1	36	3.0	0.1	3.3%	0.1	4.4%	0.1	2.3%	0.3	10.4%	0.4	12.0%
	High Positive 2	36	3.3	0.1	2.2%	0.1	2.4%	0.2	4.7%	0.2	7.2%	0.3	9.2%
	Low Positive 1	36	1.4	0.0	3.0%	0.1	4.7%	0.1	10.1%	0.2	15.5%	0.3	19.3%
	Low Positive 2	36	1.3	0.0	2.2%	0.0	3.6%	0.0	3.1%	0.2	14.0%	0.2	15.0%
	Positive Control	36	2.2	0.1	2.9%	0.1	2.2%	0.0	0.0%	0.5	23.3%	0.5	23.6%
T. pallidum recombinant 17kD	High Positive 1	36	3.2	0.1	3.1%	0.2	4.8%	0.0	0.0%	0.3	7.9%	0.3	9.7%
	High Positive 2	36	2.8	0.1	2.8%	0.1	4.2%	0.1	2.5%	0.2	8.2%	0.3	9.9%
	Low Positive 1	36	1.3	0.0	3.7%	0.0	1.9%	0.1	5.5%	0.1	6.2%	0.1	9.3%
	Low Positive 2	36	1.3	0.0	2.5%	0.0	3.7%	0.1	6.0%	0.1	5.6%	0.1	9.4%
	Positive Control	36	2.3	0.1	3.2%	0.0	1.5%	0.1	3.5%	0.3	13.3%	0.3	14.2%
T. pallidum recombinant 47kD	High Positive 1	36	3.8	0.1	2.3%	0.1	1.9%	0.2	5.2%	0.3	7.8%	0.4	9.9%
	High Positive 2	36	3.6	0.1	2.4%	0.1	2.3%	0.0	0.0%	0.3	7.5%	0.3	8.2%
	Low Positive 1	36	1.2	0.0	3.8%	0.0	2.4%	0.1	5.6%	0.1	11.1%	0.2	13.2%
	Low Positive 2	36	1.3	0.0	2.9%	0.0	3.2%	0.1	4.1%	0.2	11.9%	0.2	13.3%
	Positive Control	36	2.3	0.1	4.0%	0.0	0.0%	0.0	0.0%	0.5	19.5%	0.5	19.9%

**Between site variance includes between lot variance.*

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C. Precision Studies

A precision panel, consisting of nine (9) panel members for each of the three (3) recombinant proteins associated with *T. pallidum* 5kD, 17kD and 47kD) was prepared by Bio-Rad Laboratories. Two (2) of the nine (9) panel members had high reactive levels of the ntibodies, two (2) had low reactive levels of the antibodies, and two (2) had antibody levels near the cut-off; additionally there were two (2) high negative panel members and one (1) low negative panel member for each analyte. Precision testing was performed at Bio-Rad Laboratories on one lot of the Syphilis IgG kit, one lot of the Syphilis IgG Calibrator Set and one lot of the Syphilis IgG Control Set. Each of the nine (9) panel members was tested in duplicate (x2) on two (2) runs per day for twenty (20) days using one (1) lot of Syphilis IgG kit, one (1) lot of Syphilis IgG Calibrator Set and one (1) lot of Syphilis IgG Control Set (2 times x 2 runs x 20 days = 80 replicates per panel member). The data were analyzed for intra-assay and inter-assay precision according to the principles described in the Clinical Laboratory Standards Institute guidance EP5-A2, revised November 2004 and ISO/TR 22971:2205. The standard deviation (SD) and percent coefficient of variation (%CV) were calculated. Results can be found in Tables 17 - 19.

Table 17. Precision Results; BioPlex 2200 Syphilis IgG 15kD

Syphilis 15kD Panel Members	Sample N*	Mean	Within-Run		Between-Day		Between-Run		Total	
			SD	%CV	SD	%CV	SD	%CV	SD	%CV
Negative	80	0.0	0.02	N/A	0.00	N/A	0.00	N/A	0.02	N/A
High Negative 1	80	0.5	0.01	2.3%	0.03	6.6%	0.03	6.6%	0.04	8.3%
High Negative 2	80	0.5	0.02	4.0%	0.03	6.7%	0.00	0.0%	0.05	9.6%
Near Cut-off 1	80	1.0	0.04	3.5%	0.07	7.0%	0.03	3.1%	0.09	8.4%
Near Cut-off 2	80	1.0	0.04	3.8%	0.06	6.5%	0.03	3.3%	0.08	7.8%
Low Positive 1	80	1.4	0.05	3.9%	0.12	8.6%	0.05	4.0%	0.14	10.4%
Low Positive 2	80	1.3	0.05	3.5%	0.10	7.9%	0.05	4.1%	0.13	9.6%
High Positive 1	80	3.1	0.11	3.7%	0.22	7.3%	0.11	3.6%	0.27	9.0%
High Positive 2	80	3.4	0.07	2.1%	0.17	5.0%	0.18	5.2%	0.26	7.6%

N/A = No precision specification established for samples below cut-off.

Table 18. Precision Results; BioPlex 2200 Syphilis IgG 17kD

Syphilis 17kD Panel Members	Sample N	Mean	Within-Run		Between-Day		Between-Run		Total	
			SD	%CV	SD	%CV	SD	%CV	SD	%CV
Negative	80	0.0	0.00	N/A	0.00	N/A	0.00	N/A	0.00	N/A
High Negative 1	80	0.5	0.04	7.0%	0.03	6.0%	0.03	6.0%	0.06	10.8%
High Negative 2	80	0.5	0.03	6.0%	0.04	8.4%	0.03	6.0%	0.06	11.5%
Near Cut-off 1	80	1.0	0.03	3.3%	0.07	6.9%	0.03	3.1%	0.08	7.9%
Near Cut-off 2	80	1.0	0.03	3.1%	0.05	5.3%	0.04	4.3%	0.08	7.3%
Low Positive 1	80	1.3	0.06	4.3%	0.09	7.5%	0.04	3.5%	0.12	9.4%
Low Positive 2	80	1.3	0.04	3.3%	0.08	6.3%	0.03	2.4%	0.10	7.4%
High Positive 1	80	3.2	0.11	3.3%	0.26	8.2%	0.08	2.4%	0.30	9.1%
High Positive 2	80	2.9	0.07	2.5%	0.20	7.1%	0.09	3.1%	0.23	8.2%

N/A = No precision specification established for samples below cut-off.

Table 19. Precision Results; BioPlex 2200 Syphilis IgG 47kD

Syphilis 47kD Panel Members	Sample N	Mean	Within-Run		Between-Day		Between-Run		Total	
			SD	%CV	SD	%CV	SD	%CV	SD	%CV
Negative	80	0.0	0.00	N/A	0.00	N/A	0.00	N/A	0.00	N/A
High Negative 1	80	0.6	0.01	1.9%	0.03	5.4%	0.00	0.0%	0.04	5.9%
High Negative 2	80	0.6	0.03	5.2%	0.00	0.0%	0.03	5.1%	0.05	7.4%
Near Cut-off 1	80	1.1	0.03	2.4%	0.04	4.3%	0.03	3.0%	0.06	5.7%
Near Cut-off 2	80	1.1	0.04	3.1%	0.05	4.8%	0.03	2.8%	0.07	6.4%
Low Positive 1	80	1.2	0.05	4.1%	0.06	6.8%	0.03	2.6%	0.10	8.5%
Low Positive 2	80	1.4	0.05	3.4%	0.09	6.5%	0.07	5.2%	0.12	8.8%
High Positive 1	80	3.4	0.06	1.8%	0.21	6.2%	0.08	2.5%	0.23	7.0%
High Positive 2	80	3.8	0.06	1.7%	0.18	4.7%	0.14	3.9%	0.24	6.3%

N/A = No precision specification established for samples below cut-off.

D. Comparative Testing

Comparative Testing

Comparison of Syphilis IgG and Non-treponemal (RPR) and TPPA test

The performance of the Syphilis IgG kit was evaluated against corresponding reference (RPR and TPPA) assays. Results were interpreted according to Table 20 below. Discordant samples were further tested by a treponemal EIA kit to determine the final result.

Table 20. Reference Syphilis Testing Algorithm

Non-treponemal Result (RPR)	Treponemal Result (TPPA)	Reference Assays Result	Treponemal (EIA) Result	Final Reference Assays Result
Nonreactive	Nonreactive	Negative	N/A	Negative
Nonreactive	Reactive	Discordant	Negative	Negative
			Equivocal	Equivocal
			Positive	Positive
Reactive	Nonreactive	Discordant	Negative	Negative
			Equivocal	Equivocal
			Positive	Positive
Reactive	Reactive	Positive	N/A	Positive

A total of 1,750 serum samples were evaluated at three (3) U.S. clinical testing sites. The results can be observed in Tables 21 – 27 for banked serum samples from patients who had a syphilis test ordered; from unselected pregnant women; from serum samples requested to be RPR/TPPA reactive; from pregnant women requested to be treponemal assay positive; from pregnant women requested to be RPR/TPPA nonreactive; and from patients medically diagnosed with syphilis. For the purposes of percent agreement, reference assay equivocal results were assigned to the opposite result than that of the corresponding BioPlex 2200 Syphilis IgG result. Results are shown in Tables 21 - 27.

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Table 21. Serum Samples From Patients Who Had a Syphilis Test Ordered (N=500)

		BioPlex 2200 Syphilis IgG							
		Reactive	Equivocal	Nonreactive	Total	Positive (+) % Agreement	95% Confidence Interval	Negative (-) % Agreement	95% Confidence Interval
Reference Assays Result	Positive	46	0	0	46	100% (46/46)	92.0 - 100%	93.8% (426/454)	91.2 - 95.7%
	Equivocal	3*	0	0	3				
	Negative	22**	3	426	451				
	Total	71	3	426	500				

** Three (3) BioPlex 2200 Syphilis IgG reactive samples were RPR nonreactive, TPPA reactive and treponemal EIA equivocal.*
*** Of 22 samples with reactive results on the BioPlex 2200 Syphilis IgG assay, 16 were RPR and TPPA nonreactive, and 6 samples were RPR reactive, TPPA nonreactive and treponemal EIA negative.*

Table 22. Unselected Serum Samples From Pregnant Women (N=497)

		BioPlex 2200 Syphilis IgG							
		Reactive	Equivocal	Nonreactive	Total	Positive (+) % Agreement	95% Confidence Interval	Negative (-) % Agreement	95% Confidence Interval
Reference Assays Result	Positive	5	0	0	5	100% (5/5)	56.5 - 100%	99.8% (491/492)	98.9 - 100.%
	Equivocal	0	0	0	0				
	Negative	1*	0	491	492				
	Total	6	0	491	497				

** One (1) sample with a BioPlex 2200 reactive result was RPR and TPPA nonreactive.*

Table 23. Serum Samples Requested to be RPR and TPPA Reactive (N=250)

		BioPlex 2200 Syphilis IgG					
		Reactive	Equivocal	Nonreactive	Total	Positive (+) % Agreement	95% Confidence Interval
Reference Assays Result	Positive	249	0	0	249	100% (249/249)	98.5 - 100%
	Equivocal	0	0	0	0		
	Negative	0	0	1	1		
	Total	249	0	1	250		

Table 24. Serum Samples From Pregnant Women Requested to be Treponemal Assay Positive (N=183)

		BioPlex 2200 Syphilis IgG					
		Reactive	Equivocal	Nonreactive	Total	Positive (+) % Agreement	95% Confidence Interval
Reference Assays Result	Positive	166	0	0	166	100% (166/166)	97.7 -100%
	Equivocal	4*	0	0	4		
	Negative	8**	0	5	13		
	Total	178	0	5	183		

** Four (4) BioPlex 2200 Syphilis IgG reactive samples were RPR nonreactive, TPPA reactive and treponemal EIA equivocal.*
*** Of eight (8) BioPlex 2200 Syphilis IgG reactive samples, 1 sample was RPR and TPPA nonreactive and 7 were RPR reactive, TPPA nonreactive and treponemal EIA negative.*

Table 25. Serum Samples From Pregnant Women Requested to be RPR/TPPA Nonreactive (N=250)

		BioPlex 2200 Syphilis IgG					
		Reactive	Equivocal	Nonreactive	Total	Negative (+) % Agreement	95% Confidence Interval
Reference Assays Result	Positive	0	0	0	0	98.8% (247/250)	96.5 -99.6%
	Equivocal	0	0	0	0		
	Negative	3*	0	247	250		
	Total	3	0	247	250		

** Three (3) BioPlex 2200 Syphilis IgG reactive samples were RPR and TPPA nonreactive.*

Table 26. Combined Serum Samples From 183 Pregnant Women Requested to be Treponemal Assay Positive and 250 Pregnant Women Requested to be RPR/TPPA Nonreactive (N=433)

		BioPlex 2200 Syphilis IgG							
		Reactive	Equivocal	Nonreactive	Total	Positive (+) % Agreement	95% Confidence Interval	Negative (-) % Agreement	95% Confidence Interval
Reference Assays Result	Positive	166	0	0	166	100% (166/166)	97.7 - 100.0%	94.4% (252/267)	90.9 - 96.6%
	Equivocal	4*	0	0	4				
	Negative	11**	0	252	263				
	Total	181	0	252	433				

** Four (4) BioPlex 2200 Syphilis IgG reactive samples were RPR reactive, TPPA nonreactive and treponemal EIA equivocal.*
*** Of 11 BioPlex 2200 Syphilis IgG reactive samples, 4 samples were RPR and TPPA nonreactive, and 7 samples were RPR nonreactive, TPPA reactive and treponemal EIA negative.*

Table 27. Serum Samples From Patients Medically Diagnosed With Syphilis (N=70)

		BioPlex 2200 Syphilis IgG					
		Reactive	Equivocal	Nonreactive	Total	Positive (+) % Agreement	95% Confidence Interval
Reference Assays Result	Positive	63	0	0	63	100.0% (63/63)	94.2 - 100%
	Equivocal	1*	0	0	1		
	Negative	3**	0	3	6		
	Total	67	0	3	70		

** One (1) sample with BioPlex 2200 Syphilis IgG reactive results was RPR nonreactive, TPPA reactive and treponemal EIA equivocal.*
*** Three (3) samples with BioPlex 2200 Syphilis IgG reactive results were RPR and TPPA nonreactive.*

As can be seen in the table above, 95.7% (67/70) of the patients medically diagnosed with syphilis infection were reactive when tested with the BioPlex 2200 Syphilis IgG test, in comparison to 90% (63/70) by reference assay testing.

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Correlation with Known HIV-1 Positive Samples

Performance of the BioPlex 2200 Syphilis IgG kit was evaluated in two hundred twenty (220) banked known HIV-1 positive serum samples. Results were compared to reference assay results for RPR/TPPA and if applicable, treponemal EIA.

Of the 220 known HIV-1 positive serum samples, one hundred eighty-one (181) were negative by reference assay testing and one hundred twenty-three (123) samples were negative by BioPlex 2200 Syphilis IgG testing, for 68.0% (123/181) negative agreement with a 95% confidence interval of 60.8-74.3%. Of the one hundred eighty-one (181) samples, 4 samples were equivocal by reference assay testing (and were considered negative for the purposes of percent agreement calculations) and nineteen (19) samples were equivocal by BioPlex 2200 Syphilis IgG testing (and were considered positive for the purposes of percent agreement calculations).

Of the 220 known HIV-1 positive serum samples, thirty-nine (39) were positive by reference assay testing and by BioPlex 2200 Syphilis IgG testing, for 100% (39/39) positive agreement with a 95% confidence interval of 91.0-100%.

Correlation with Disease Stages and Clinical Sensitivity

The performance of the Syphilis IgG kit was evaluated at one clinical testing site using a CDC panel of banked frozen characterized sera (N=140), with known disease state and treatment status. Panel samples were from treated and untreated patients with primary, secondary or latent infections. Performance of the Syphilis IgG kit for the CDC panel was compared to reference assay results using commercially available (RPR, TPPA and if required treponemal EIA) kits by known clinical status. Results are shown in Tables 28 – 30 below.

Table 28. BioPlex 2200 Syphilis IgG vs. Reference Assays: Comparison by Known Clinical Status

Known Clinical Status		Reference Assays Result									Total
		Positive			Equivocal			Negative			
		BioPlex 2200 Syphilis IgG			BioPlex 2200 Syphilis IgG			BioPlex 2200 Syphilis IgG			
		R	EQV	NR	R	EQV	NR	R	EQV	NR	
Untreated	Primary	10	0	0	0	0	0	0	0	2	12
	Secondary	10	0	0	0	0	0	0	0	0	10
	Latent	8	0	0	0	0	0	0	0	5	13
Treated	Primary	15	0	0	0	0	0	0	0	1	16
	Secondary	36	0	0	0	0	0	0	0	0	36
	Latent	49	0	0	0	0	0	0	0	4	53
Total		128	0	0	0	0	0	0	0	12	140

Table 29. Bio-Rad Syphilis IgG vs. a CDC Panel of Characterized Sera (N=140)

Known Clinical Status		N	BioPlex 2200 Syphilis IgG					Reference Assays Result				
			Reactive	Equivocal	Nonreactive	Clinical Sensitivity %	95% Confidence Interval	Positive	Equivocal	Negative	Clinical Sensitivity %	95% Confidence Interval
Untreated	Primary	12	10	0	2	83.3% (10/12)	55.2 - 95.3%	10	0	2	83.3% (10/12)	55.2 - 95.3%
	Secondary	10	10	0	0	100% (10/10)	72.2 - 100%	10	0	0	100% (10/10)	72.2 - 100%
	Latent	13	8	0	5	61.5% (8/13)	35.5 - 82.3%	8	0	5	61.5% (8/13)	35.5 - 82.3%
Treated	Primary	16	15	0	1	93.8% (15/16)	71.6 - 98.9%	15	0	1	93.8% (15/16)	71.6 - 98.9%
	Secondary	36	36	0	0	100% (36/36)	90.3 - 100%	36	0	0	100% 36/36)	90.3 - 100%
	Latent	53	49	0	4	92.5% (49/53)	82.1 - 97.0%	49	0	4	92.5% (49/53)	82.1 - 97.0%
Total		140	128	0	12	91.4% (128/140)	85.6 - 95.0%	128	0	12	91.4% (128/140)	85.6 - 95.0%

Table 30. BioPlex 2200 Syphilis IgG vs. Reference Assays: Percent Agreement by Known Clinical Status

Known Clinical Status		N	Positive Agreement		95% Confidence Interval
Untreated	Primary	12	(10/10)	100%	72.2 - 100%
	Secondary	10	(10/10)	100%	72.2 - 100%
	Latent	13	(8/8)	100%	67.5 - 100%
Treated	Primary	16	(15/15)	100%	79.6 - 100%
	Secondary	36	(36/36)	100%	90.3 - 100%
	Latent	53	(49/49)	100%	91.8 - 100%
Total		140	(128/128)	100%	97.1 - 100%

The performance of the Syphilis IgG kit was further evaluated at one clinical testing site using banked prospectively collected serum samples from treated and untreated patients with primary and secondary syphilis infections (N=10). Performance of the Syphilis IgG kit in the 10 samples was compared to a corresponding composite result using commercially available (RPR, TPPA and if required treponemal EIA) kits by known clinical status. Results are shown in Tables 31 - 33 below.

Table 31. BioPlex 2200 Syphilis IgG vs. Reference Assays: Comparison by Known Clinical Status

Known Clinical Status		Reference Assays Result									Total
		Positive			Equivocal			Negative			
		BioPlex 2200 Syphilis IgG			BioPlex 2200 Syphilis IgG			BioPlex 2200 Syphilis IgG			
		R	EQV	NR	R	EQV	NR	R	EQV	NR	
Untreated	Primary	0	0	0	0	0	0	1	0	0	1
	Secondary	0	0	0	0	0	0	0	0	0	0
Treated	Primary	2	0	0	0	0	0	0	0	0	2
	Secondary	7	0	0	0	0	0	0	0	0	7
Total		9	0	0	0	0	0	1	0	0	10

Table 32. Bio-Rad Syphilis IgG vs. Prospectively Collected Serum Samples With Known Clinical Status (N=10)

Known Clinical Status		N	BioPlex 2200 Syphilis IgG					Reference Assays Result				
			Reactive	Equivocal	Nonreactive	Clinical Sensitivity %	95% Confidence Interval	Positive	Equivocal	Negative	Clinical Sensitivity %	95% Confidence Interval
Untreated	Primary	1	1	0	0	100% (1/1)	20.6 - 100%	0	0	1	0.0% (0/1)	N/A*
	Secondary	0	0	0	0	N/A*	N/A*	0	0	0	N/A*	N/A*
Treated	Primary	2	2	0	0	100% (2/2)	34.2 - 100%	2	0	0	100% (2/2)	34.2 - 100%
	Secondary	7	7	0	0	100% (7/7)	64.5 - 100%	7	0	0	100% (7/7)	64.5 - 100%
Total		10	10	0	0	100% (10/10)	72.2 - 100%	9	0	1	90.0% (9/10)	59.5 - 98.2%

** In cases where agreement resulted in a numerator of zero (0), 95% confidence interval could not be calculated; in cases where agreement resulted in (0/0) samples, percent agreement and 95% confidence interval could not be calculated.*

Table 33. BioPlex 2200 Syphilis IgG vs. Reference Assays: Percent Agreement by Known Clinical Status

Known Clinical Status		N	Positive Agreement		95% Confidence Interval
Untreated	Primary	1	(0/0)	N/A*	N/A*
	Secondary	0	(0/0)	N/A*	N/A*
Treated	Primary	2	(2/2)	100%	34.2 - 100%
	Secondary	7	(7/7)	100%	64.5 - 100%
Total		10	(9/9)	100%	70.1 - 100%

** In cases where agreement resulted in (0/0) samples percent agreement and 95% confidence intervals could not be calculated.*

The results from testing the CDC panel of samples from patients with treated and untreated primary, secondary and latent syphilis infections (N=140); and the banked prospectively collected samples from treated and untreated patients with primary and secondary syphilis infections (N=10), were combined and results are presented in Tables 34 - 36 below.

Table 34. BioPlex 2200 Syphilis IgG vs. Reference Assays: Combined Comparison By Known Clinical Status

Known Clinical Status		Reference Assays Result									Total
		Positive			Equivocal			Negative			
		BioPlex 2200 Syphilis IgG			BioPlex 2200 Syphilis IgG			BioPlex 2200 Syphilis IgG			
		R	EQV	NR	R	EQV	NR	R	EQV	NR	
Untreated	Primary	10	0	0	0	0	0	1	0	2	13
	Secondary	10	0	0	0	0	0	0	0	0	10
	Latent	8	0	0	0	0	0	0	0	5	13
Treated	Primary	17	0	0	0	0	0	0	0	1	18
	Secondary	43	0	0	0	0	0	0	0	0	43
	Latent	49	0	0	0	0	0	0	0	4	53
Total		137	0	0	0	0	0	1	0	12	150

Table 35. BioPlex 2200 Syphilis IgG vs. Combined CDC Panel and Prospectively Collected Samples With Known Clinical Status (N=150)

Known Clinical Status		N	BioPlex 2200 Syphilis IgG					Reference Assays Result				
			Reactive	Equivocal	Nonreactive	Clinical Sensitivity %	95% Confidence Interval	Reactive	Equivocal	Nonreactive	Clinical Sensitivity %	95% Confidence Interval
Untreated	Primary	13	11	0	2	84.6% (11/13)	57.8 - 95.7%	10	0	3	76.9% (10/13)	49.7 - 91.8%
	Secondary	10	10	0	0	100% (10/10)	72.2 - 100%	10	0	0	100% (10/10)	72.2 - 100%
	Latent	13	8	0	5	61.5% (8/13)	35.5 - 82.3%	8	0	5	61.5% (8/13)	35.5 - 82.3%
Treated	Primary	18	17	0	1	94.4% (17/18)	74.2 - 99.0%	17	0	1	94.4% (17/18)	74.2 - 99.0%
	Secondary	43	43	0	0	100% (43/43)	91.8 - 100%	43	0	0	100% (43/43)	91.8 - 100%
	Latent	53	49	0	4	92.5% (49/53)	82.1 - 97.0%	49	0	4	92.5% (49/53)	82.1 - 97.0%
Total		150	138	0	12	92.0% (138/150)	86.5 - 95.4%	137	0	13	89.5% (137/150)	86.5 - 94.9%

** In cases where agreement resulted in (0/0) samples, sensitivity and 95% confidence intervals could not be calculated.*

Table 36. BioPlex 2200 Syphilis IgG vs. Reference Assays: Combined Percent Agreement By Known Clinical Status

Known Clinical Status		N	Positive Agreement		95% Confidence Interval
Untreated	Primary	13	(10/10)	100%	72.2 - 100%
	Secondary	10	(10/10)	100%	72.2 - 100%
	Latent	13	(8/8)	100%	67.5 - 100%
Treated	Primary	18	(17/17)	100%	81.6 - 100%
	Secondary	43	(43/43)	100%	91.8 - 100%
	Latent	53	(49/49)	100%	92.7 - 100%
Total		150	(137/137)	100%	97.3 - 100%

Diagnostic Screening Results

The results presented in the preceding tables demonstrate that BioPlex 2200 Syphilis IgG can be used for the qualitative detection of antibodies to *Treponema pallidum* in human serum when used as a diagnostic screening test.

BioPlex 2200 Syphilis IgG Reactive Samples

• In the banked purchased requested to be RPR/TPPA reactive samples (N=250), 249 samples were BioPlex 2200 Syphilis IgG reactive. Of those 249 samples, 100% (249/249) were RPR reactive.

• In the banked purchased samples from unselected pregnant women (N=497), 6 samples were BioPlex 2200 Syphilis IgG reactive. Of those 6 samples, 33.3% (2/6) were RPR reactive.

• In the banked samples from patients with a syphilis test ordered (N=500), 71 samples were BioPlex 2200 Syphilis IgG reactive. Of those 71 samples, 28.2% (20/71) were RPR reactive.

• In the banked purchased samples from pregnant women requested to be treponemal assay positive (N=183), 178 samples were BioPlex 2200 Syphilis IgG reactive. Of those 178 samples, 24.7% (44/178) were RPR reactive.

• In the banked purchased samples from pregnant women requested to be RPR/TPPA nonreactive (N=250), 3 of the samples were BioPlex 2200 Syphilis IgG reactive. Of those 3 samples, none were RPR reactive.

• In the banked prospectively collected samples from patients with medically diagnosed syphilis infections (N= 70), 67 of the samples were BioPlex 2200 Syphilis IgG reactive. Of those 67 samples, 86.6% (58/67) were RPR reactive.

• In the CDC panel of well characterized samples from treated or untreated patients with primary, secondary or latent syphilis infection (N=140), 128 of the samples were BioPlex 2200 Syphilis IgG reactive. Of those 128 samples, 99.2% (127/128) were RPR reactive.

• In the banked prospectively collected samples from treated or untreated patients with primary or secondary syphilis infection (N=10), 10 of the samples were BioPlex 2200 Syphilis IgG reactive. Of those 10 samples, 100% (10/10) were RPR reactive.

Diagnostic Confirmatory Results

Results from testing with the BioPlex 2200 Syphilis IgG are presented below to demonstrate its utility as a diagnostic confirmatory test. This test also confirms reactive results from nontreponemal based screening assays.

RPR Reactive Samples

• In the banked purchased samples from unselected pregnant women (N=497), 4 samples were RPR reactive. Of those 4 samples, 50% (2/4) were TPPA reactive and 50% (2/4) were BioPlex 2200 Syphilis IgG reactive.

• In the banked purchased requested to be RPR/TPPA reactive samples (N=250), 250 samples were RPR reactive. Of those 250 samples, 99.6% (249/250) were TPPA reactive and 99.6% (249/250) were BioPlex 2200 Syphilis IgG reactive.

• In the banked samples from patients with a syphilis test ordered (N=500), 20 samples were RPR reactive. Of those 20 samples, 90% (18/20) were TPPA reactive and 100% (20/20) were BioPlex 2200 Syphilis IgG reactive.

• In the banked purchased samples from pregnant women requested to be treponemal assay positive (N=183), 44 samples were RPR reactive. Of those 44 samples, 100% (44/44) were reactive with the TPPA and 100% (44/44) were reactive with the BioPlex 2200 Syphilis IgG test.

• In the banked purchased samples from pregnant women requested to be RPR/TPPA nonreactive (N=250), 3 of the samples were RPR reactive. None of the samples were TPPA or BioPlex 2200 Syphilis IgG reactive.

• In the banked prospectively collected samples from patients with medically diagnosed syphilis infections (N= 70), 58 of the samples were RPR reactive. Of those 58 samples, 100% (58/58) were reactive with the TPPA and 100% (58/58) were reactive with the BioPlex 2200 Syphilis IgG test.

• In the CDC panel of well characterized samples from treated or untreated patients with primary, secondary or latent syphilis infection (N=140), 138 of the samples were RPR reactive. Of those 138 samples, 92% (127/138) were reactive with TPPA and 92% (127/138) were reactive with the BioPlex 2200 Syphilis IgG test.

• In the banked prospectively collected samples from treated or untreated patients with primary or secondary syphilis infection (N=10), 10 of the samples were RPR reactive. Of those 10 samples, 90% (9/10) were TPPA reactive and 100% (10/10) were BioPlex 2200 Syphilis IgG reactive.

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E. Cross-Reactivity

A cross-reactivity study was performed to determine if samples from various disease states and other potentially interfering factors interfere with test results when tested with the BioPlex 2200 Syphilis IgG kit. A panel of ten (10) specimens positive for each cross reactant were evaluated for possible cross reactivity with the BioPlex 2200 Syphilis IgG kit. The test specimens were also evaluated by TPPA, and where BioPlex 2200 Syphilis IgG results did not agree with TPPA, samples were further tested by RPR and a commercially available EIA. The results demonstrated that the various disease state samples evaluated do not cross react with the BioPlex 2200 Syphilis IgG kit. Most of the samples evaluated were high positive for each disease state. The majority of all samples that elicited a positive result were also confirmed positive by the another treponemal antibody test (TPPA), indicating reactivity to Syphilis (*T. pallidum*) IgG antibodies rather than cross reactivity. Results can be found in Table 37.

Table 37. Cross-Reactivity

Cross Reactives	N	Method	Syphilis IgG
ANA	10	BioPlex 2200	3
		TPPA	2
		Discrepants	1
dsDNA	10	BioPlex 2200	0
		TPPA	0
		Discrepants	0
HCV	10	BioPlex 2200	3
		TPPA	3
		Discrepants	0
E. Coli	4*,†††	BioPlex 2200	0
		TPPA	N/A
		Discrepants	0
HSV-1 IgG	10	BioPlex 2200	1
		TPPA	0
		Discrepants	1
Lyme IgG Borrelia burgdorferi	10	BioPlex 2200	1
		TPPA	1
		Discrepants	0
VZV IgG	10	BioPlex 2200	0
		TPPA	0
		Discrepants	0
Hyper-gamma-globulinemia	10	BioPlex 2200	2
		TPPA	1
		Discrepants	1
Leptospirosis	7	BioPlex2200	2
		Predicate	2
		Discrepants	0
Rheumatoid Factor	10	BioPlex 2200	0
		TPPA	0
		Discrepants	0
CMV IgG	10	BioPlex 2200	0
		TPPA	0
		Discrepants	0
HIV	10	BioPlex 2200	2
		TPPA	2
		Discrepants	0
HTLV	10	BioPlex 2200	0
		TPPA	0
		Discrepants	0
Pregnant women	10	BioPlex 2200	0
		TPPA	0
		Discrepants	0
HSV-2 IgG	10	BioPlex 2200	1
		TPPA	1
		Discrepants	0
Lyme IgG Afzelii / Garni	49**,†	BioPlex 2200	1
		TPPA	1††
		Discrepants	0
EBV IgG	10	BioPlex 2200	0
		TPPA	0
		Discrepants	0
Small Pox	10†††	BioPlex 2200	0
		TPPA	N/A
		Discrepants	0

** Due to limited availability of samples, only four E. coli specimens were evaluated.*
*** Additional samples were tested to evaluate the various lyme strains.*
† Only positive samples were tested by the predicate.
†† Sample was negative by TPPA but positive by both RPR and EIA
††† Testing was only performed on the BioPlex 2200 Syphilis IgG assay.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
2098 Gaither Road
Rockville MD 20850

MAR 19 2007

Mr. David Bhend
Regulatory Affairs Associate
Bio-Rad Laboratories
Diagnostics Group
6565 185th Avenue NE
Redmond, WA 98052

Re: k063866
Trade/Device Name: BioPlex 2200 Syphilis IgG kit on the BioPlex 2200 Multi-Analyte Detection System
Regulation Number: 21 CFR 866.3830
Regulation Name: Treponema pallidum treponemal test reagents
Regulatory Class: Class II
Product Code: LIP
Dated: March 8, 2007
Received: March 9, 2007

Dear Mr. Bhend:

We have reviewed your Section 510(k) premarket notification of intent to market the device referenced above and have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act) that do not require approval of a premarket approval application (PMA). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

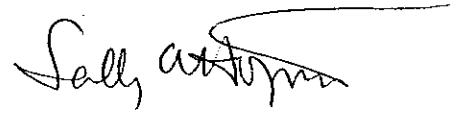
If your device is classified (see above) into either class II (Special Controls) or class III (PMA), it may be subject to such additional controls. Existing major regulations affecting your device can be found in Title 21, Code of Federal Regulations (CFR), Parts 800 to 895. In addition, FDA may publish further announcements concerning your device in the Federal Register.

Please be advised that FDA's issuance of a substantial equivalence determination does not mean that FDA has made a determination that your device complies with other requirements of the Act or any Federal statutes and regulations administered by other Federal agencies. You must comply with all the Act's requirements, including, but not limited to: registration and listing (21 CFR Part 807); labeling (21 CFR Parts 801 and 809); and good manufacturing practice requirements as set forth in the quality systems (QS) regulation (21 CFR Part 820).

This letter will allow you to begin marketing your device as described in your Section 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific information about the application of labeling requirements to your device, or questions on the promotion and advertising of your device, please contact the Office of In Vitro Diagnostic Device Evaluation and Safety at (240)276-0450. Also, please note the regulation entitled, "Misbranding by reference to premarket notification" (21CFR Part 807.97). Other general information on your responsibilities under the Act may be obtained from the Division of Small Manufacturers, International and Consumer Assistance at its toll-free number (800) 638-2041 or (301) 443-6597 or at its Internet address http://www.fda.gov/cdrh/dsma/dsmamain.html.

Sincerely yours,



Sally A. Hojvat, M.Sc., Ph.D.
Director
Division of Microbiology Devices
Office of *In Vitro* Diagnostic Device
Evaluation and Safety
Center for Devices and
Radiological Health

Enclosure

INDICATIONS FOR USE STATEMENT

510(k) Number (if known): k063866

Device Name: BioPlex 2200 Syphilis IgG kit on the BioPlex 2200 Multi-Analyte Detection System

Indications for Use:

The Bio-Rad Syphilis IgG kit is a multiplex flow immunoassay intended for the qualitative detection of *Treponema pallidum* IgG antibodies in human serum. The test system, when used in conjunction with non-treponemal based assays, provides serological evidence of infection with *T. pallidum*. This test system is also indicated for use in confirming reactive test results from non-treponemal based screening assays.

The Syphilis IgG kit is intended for use with the Bio-Rad BioPlex 2200 System.

The BioPlex 2200 Syphilis IgG kit is not intended for use in screening blood or plasma donors.

Warning: A positive result is not useful for establishing a diagnosis of Syphilis. In most situations, such a result may reflect prior treated infection; a negative result can exclude a diagnosis of syphilis except for incubating or early primary disease.

Prescription Use: ___X___ AND/OR Over-The-Counter Use: _____
(Per 21 CFR 801.109) (Optional Format 1-2-96)

(PLEASE DO NOT WRITE BELOW THIS LINE – CONTINUE ON ANOTHER PAGE IF NEEDED)

Concurrence of CDRH, Office of Device Evaluation (ODE)

Division Sign-Off

Office of In Vitro Diagnostic Device Evaluation and Safety

510(k) K063866